

CYROLON® Polycarbonate Sheet

Technical Data Sheet



PRODUCT DESCRIPTION

CYROLON® polycarbonate extruded sheet is a transparent thermoplastic sheet that is a cost-effective solution for a wide variety of applications. CYROLON® sheet offers high optical quality and excellent impact strength. Aside from its superior durability, CYROLON® polycarbonate is 200 times stronger than glass and half the weight of glass. Tight dimensional tolerances, UV-stability, high temperature resistance, and flexibility allow for easy fabrication, machining, thermoforming, and brake bending.

FEATURES AND BENEFITS

- Lightweight – half the weight of glass
- Transparent – up to 90% light transmission (thickness-dependent)
- Strong – 200 times stronger than glass, 30 times stronger than acrylic
- Tight Dimensional Tolerances
- Flexible – easy to fabricate, machine, thermoform, and break bend
- High Temperature Resistance
- UV-Stable

PRODUCTS AVAILABLE

CYROLON® - our standard grade polycarbonate sheet – color code 0C001 with a “GT” physical property

CYROLON® UV2 - our standard grade polycarbonate sheet plus a UV-protecting caplayer on both sides – color code 0C004 with a “GT” physical property

CYROLON® MR7 - our standard grade polycarbonate sheet plus a UV-protecting abrasion-resistant coating on both sides, includes a 7-year weathering warranty – color code 0C001 with “UV2” physical property

Standard sheet thicknesses - 3mm, 4.5mm, and 5.6mm

Standard sheet sizes - 4’x8’, 5’x8’, and 6’x8’

IMPACT STRENGTH

CYROLON® polycarbonate sheet is a tough, durable thermoplastic product. Its high impact strength (200 times stronger than glass) makes it an excellent choice for applications where there is risk associated with breakage. It can withstand impact from a variety of objects without breaking.

- Impact resistance (3mm) via Gardner Impact per ASTM D-5420 > 320 ft-lbs
- Impact resistance (3mm) via notched IZOD per ASTM D-625 = 18 ft-lbs/in

OPTICAL PROPERTIES

Light transmission of polycarbonate sheet varies inversely with sheet thickness.

- Light transmission per ASTM D-1003 = 88% (3mm), 86.5% (4.5mm), 86% (5.6mm)
- Haze per ASTM D 1003 (3mm) < 1.0%

THERMAL PROPERTIES

Polycarbonate sheet expands with increases in temperature, and this needs to be considered for applications where the temperature may vary.

- Coefficient of thermal expansion per ASTM D-696 = 3.6×10^{-5} in/in/°F = 6.5×10^{-5} in/in/°C
- Vicat softening temperature per ASTM D-1525 = 290°F

WEATHERABILITY

The degree of weatherability of CYROLON® products varies with the grade.

- CYROLON® standard grade is UV-stabilized but is not recommended for outdoor applications.
- CYROLON® UV2 has a UV-protective caplayer on both sides and provides enhanced outdoor weatherability.
- CYROLON® MR7 has a UV-protective hard-coating on both sides and carries a 7-year limited weathering warranty from Roehm America against yellowing, loss of light transmission, and coating failure.

FLAMMABILITY

CYROLON® polycarbonate sheet is a thermoplastic that will potentially melt and burn when exposed to a flame. Protection should be taken to protect this material from flames and high heat sources. Its suitability for an application is a function of the flammability rating below.

- Flammability per UL-94 (all CYROLON® grades) = HB (3mm) or V2 (4.5mm, 5.6mm)

REGULATORY COMPLIANCE

CYROLON® polycarbonate sheet carries the following regulatory certifications:

- REACH, RoHS, California Prop 65

HANDLING AND STORAGE

CYROLON® polycarbonate sheet is packaged with polyethylene overwrap and onto pallets. It is recommended that the package be kept closed until the sheet is ready to be used, and that the sheet be wrapped back into the original packaging whenever possible. Avoid storing the product outdoors and in locations where it will be subject to excessive heat, moisture, sunlight, etc.

FABRICATION

CYROLON® polycarbonate sheet is a forgiving thermoplastic sheet during fabrication operations and regular power tools can be used, as long as they are in good condition and cutting surfaces are sharp. It can be sawed with circular saws, band saws, and table saws. It can be routed and drilled like wood and many other plastics. Carbide-tipped tools are recommended, and heat buildup must be minimized for proper cutting.

Laser cutting, flame polishing, and edge finishing are not recommended with CYROLON® polycarbonate sheet. Rough edges can be improved by sanding and buffing/polishing with a mild abrasive buffing compound.

CYROLON® polycarbonate sheet can be bonded using polyurethane, epoxy, and silicone adhesives that are available in the market. Additionally, solvent cementing may be accomplished using methylene chloride (MDC). Note that hard-coated CYROLON® polycarbonate sheet cannot be solvent cemented on the coating unless the coating is removed via sanding, etc.

CHEMICAL RESISTANCE

CYROLON® polycarbonate sheet has varying degrees of chemical resistance to many cleaners and solvents, please contact us for information on specific chemicals.

Additionally, CYROLON® MR7 polycarbonate sheet has a chemical-resistant hard coating on both sides that improves chemical resistance for materials such as MEK, acetone, and methylene chloride. Please contact us for information on specific chemicals.

FORMING

- Drying - CYROLON® polycarbonate sheet needs to be dried before forming to remove moisture. Drying time is a function of thickness. It is recommended to dry at 250°F for 6 hours (3mm), 13 hours (4.5mm), and 20 hours (5.6mm).
- Thermoforming – Thermoforming temperatures should be in the range of 340-475°F, and the process should occur with the sheet clamped in the mold.
- Brake forming – CYROLON® polycarbonate sheet can be brake formed and cold bent, and the minimum recommended radius is no less than 175 times the sheet thickness.
- Line bending – Nichrome wire, tubular rod heaters, and infrared heaters work well. Material temperatures of 310-330°F are usually sufficient for line bending.